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Arctic Craft Demonstration Report

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Arctic Craft Demonstration Report

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16. Abstract (MAXIMUM 200 WORDS) This report summarizes the activities associated with an Arctic Craft Demonstration resulting from Broad Agency Announcement HSCG32-12-R-R00010. This BAA invited industry to demonstrate their craft's unique capabilities that facilitate operations in a harsh Arctic environment. The demonstration took place August 2012 in Barrow, Alaska. This report also summarizes observations and evaluations of Arctic craft operations in the Prudhoe Bay area.					
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EXECUTIVE SUMMARY

As the multi-year ice within the Polar Regions recedes, the Coast Guard (CG) is preparing for increased operations within the Exclusive Economic Zone (EEZ) north of Alaska. At this time the CG does not have craft capable of efficiently and effectively supporting multiple operations in the Arctic environment on a level equivalent to that of other CG boats in other AORs. It is highly unlikely that there is one craft that will effectively support all CG mission requirements in an environment as extreme as the Alaskan Arctic. To accomplish CG missions in the Arctic, a CG Arctic craft will need to have certain capabilities uniquely suitable for this challenging environment. The purpose of this phase of the project was to conduct operational research by witnessing unique Arctic craft demonstrate their capabilities in an Arctic environment. The Coast Guard's Research and Development Center (RDC) was interested in determining what type of craft and craft technologies existed that could improve CG mission functionality in the Arctic waters. To accomplish this, the RDC invited industry to participate by publishing Broad Agency Announcement (BAA) HSCG32-12-R-R00010. This BAA requested offerors to provide a craft with advanced Arctic capabilities for five days of demonstrations in Barrow, Alaska for Coast Guard observers. All logistical and operational requirements were the responsibility of the contractors. Coast Guard personnel observed and analyzed all aspects of their operations including craft performance, craft reliability, craft storage, transportation concerns, and other logistical issues. This report summarizes the execution of the Arctic Craft Demonstration and documents the lessons learned.

Members from the RDC and Surface Forces Logistics Center (SFLC) also travelled to Prudhoe Bay to evaluate Arctic craft operations in that region. Prudhoe Bay is home to North America's largest oil field and various types of Arctic craft are operated for logistical support and kept on standby for oil spill response. This report also documents their observations and evaluations concerning Arctic craft operations in support of that industry.



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1 BACKGROUND

As the multi-year ice within the Polar Regions recedes, the Coast Guard (CG) is preparing for increased operations within the Exclusive Economic Zone (EEZ) north of Alaska. To accomplish CG missions in the Arctic, a CG Arctic craft will need to have certain capabilities uniquely suitable for this challenging environment. The operational environment of the north slope of Alaska is significantly different from the non-Polar environments where the Coast Guard boat crews currently operate. Differences include the varying ice conditions encountered, extreme cold, a silted ocean floor, high waves that build quickly, and a lack of any infrastructure to support operations. Currently operational Coast Guard boats have not been specifically designed for these conditions. There are also a number of logistical issues unique to the Arctic. For example, almost all non-cutter based equipment used by the Coast Guard is transported by C-130 aircraft due to lack of transportation infrastructure. In addition, Arctic Areas of Responsibility (AORs) are so remote normal maintenance logistics are very difficult to accomplish. This can be caused by lack of equipment, lack of a maintenance facility, limited supplies and other logistical hurdles.

Currently the Coast Guard is conducting research to identify Arctic Craft that are fully capable of performing similar functions to those that are traditionally performed by existing CG boats, which are able to respond rapidly to CG missions and conduct planned patrols in non-Polar CG AORs. Some of these functions include: search and rescue, recovery of persons from the water, transfer of persons and equipment from boat to boat, towing of disabled craft, transfer of persons to and from CG helicopters, medical assistance, fire fighting and rescue assistance, recreational boating safety, marine environmental protection, enforcement of laws and treaties, port security and safety, and defense operations and contingency preparedness. The difference would be to perform these similar functions while operating in the Arctic's shallow waters and among ice flows while insulating the crew from the inherent cold weather environment. Further, the Craft needs to be able to accomplish these missions while operating in the Northern Alaska coastal areas where the maritime infrastructure lacks developed boat ramps, piers, and in many cases any sheltered water access.

Construction of such ramps and piers is impractical due to the extreme environmental conditions resulting in constant movement of silt and ice along the coast. Boats used in this region are primarily launched directly from the beach. The waters along the North Slope can be very shallow near the beach and remain shallow for a considerable distance offshore. To further exacerbate this problem, much of the seafloor is comprised of very fine silt particles that are easily taken into mechanical systems operating in these waters. Finally, the strong winds and unimpeded fetch result in high significant wave heights. It is anticipated that the CG will not attempt to build any substantial infrastructure in the near future. Therefore the CG is looking for Arctic craft that can overcome these operational and logistical obstacles.

Because of the multi-mission nature of the CG and its operations, a craft that can perform a significant number of the eleven statutory CG missions in the Arctic are of the most interest. At this time the CG does not have craft capable of efficiently and effectively supporting multiple operations in the Arctic environment on a level equivalent to that of other CG boats in other AORs. It is highly unlikely that there is one craft that will effectively support all CG mission requirements anywhere let alone the extreme environment of the Alaskan Northern Slope. This project is attempting to identify and demonstrate innovative craft that have the best combination of capabilities to accomplish the broadest range of CG mission objectives in the Arctic Environment.



2 SCOPE

The purpose of this phase of the project was to conduct operational research by witnessing unique Arctic craft demonstrate their capabilities in an Arctic environment. The Coast Guard's Research and Development Center (RDC) was interested in determining what type of craft and craft technologies existed that could improve CG mission functionality in the Arctic waters near Barrow, Alaska. To accomplish this, the RDC invited industry to participate by publishing Broad Agency Announcement HSCG32-12-R-R00010. This BAA requested offerors to provide a craft with advanced Arctic capabilities for five days of demonstrations in Barrow for Coast Guard observers. All logistical and operational requirements were the responsibility of the contractors. Coast Guard personnel observed and analyzed all aspects of their operations including craft performance, craft reliability, craft storage, transportation concerns, and other logistical issues.

3 BAA DEVELOPMENT AND RESULTS

The first step was to identify what capabilities a contractor could demonstrate that could be beneficial to CG craft executing missions in the Arctic. Members from the R&D Center, CG District 17, and the Office of Boat Forces developed a list of capabilities that they thought would improve the functionality of a craft operating in this difficult environment. The group realized it was unlikely any one platform would be able to demonstrate all of the capabilities listed. For the demonstration it was not required that craft demonstrate all of the capabilities identified. The goal was to allow the contractor's craft to demonstrate as many of the capabilities as their platform was able to.

RDC personnel determined that the best contracting vehicle to accomplish this demonstration was a Broad Agency Agreement (BAA). Per 48 CFR 36.106, a BAA is a contracting technique used by the government to "acquire scientific study and experimentation directed toward advancing state of the art or increasing knowledge or understanding" in broadly defined areas of interest. Based on market research carried out in FY11, R&D Center staff determined that meaningful proposals with varying technical approaches could reasonably be expected in response to the BAA.

The BAA required that the contractors be responsible for all logistical requirements to transport their craft to Barrow and demonstrate its capabilities in accordance with the proposed Scope of Work. It also required the craft to comply with all applicable local and federal laws during the demonstration. The prospective respondents also had to address the impact of executing the demonstration during any five day period during August 2012 to accommodate weather or other operational limitations.

The BAA was posted on Federal Business Opportunities website (FedBizOpps.gov) on January 30 and closed March 16, 2012 at 2:00 PM EST. A copy of the BAA can be found in the appendix of this report. The BAA Technical Evaluation Team (TET) was organized to evaluate the responses and determine the best proposal. The TET consisted of members from the RDC, the Office of Boat Forces, and District 17. The TET was instructed by the Contracting Officer that the proposals should be evaluated independently against the criteria in the BAA and not compared to each other. The responses were distributed for independent individual review by the TET members. In early April, after each member had time to evaluate all proposals, the TET met as a group to consolidate their evaluations. The TET determined that based on the criteria in the BAA, Tyler Rental Inc. and ARKTOS Developments Ltd. provided the best value proposals. Once the technical evaluations were complete the contracting officer evaluated the cost proposals for completeness and then notified the contractors.



4 DESCRIPTIONS OF CRAFT SELECTED

4.1 ARKTOS Developments, Ltd.

The ARKTOS Evacuation Craft was developed for the offshore energy companies that required a lifeboat that could operate from their installations in ice covered Arctic seas. The craft is capable of transporting up to 52 persons away from a facility in an Arctic environment in the event of an emergency. The ARKTOS Evacuation Craft has a Certificate of Approval 160.035/563/1 from the USCG as a Lifeboat for Merchant Vessels. The craft is “approved for drive-off applications on bottom-bearing structures in US waters that are seasonally surrounded by ice, as equivalent to a domestic lifeboat.”

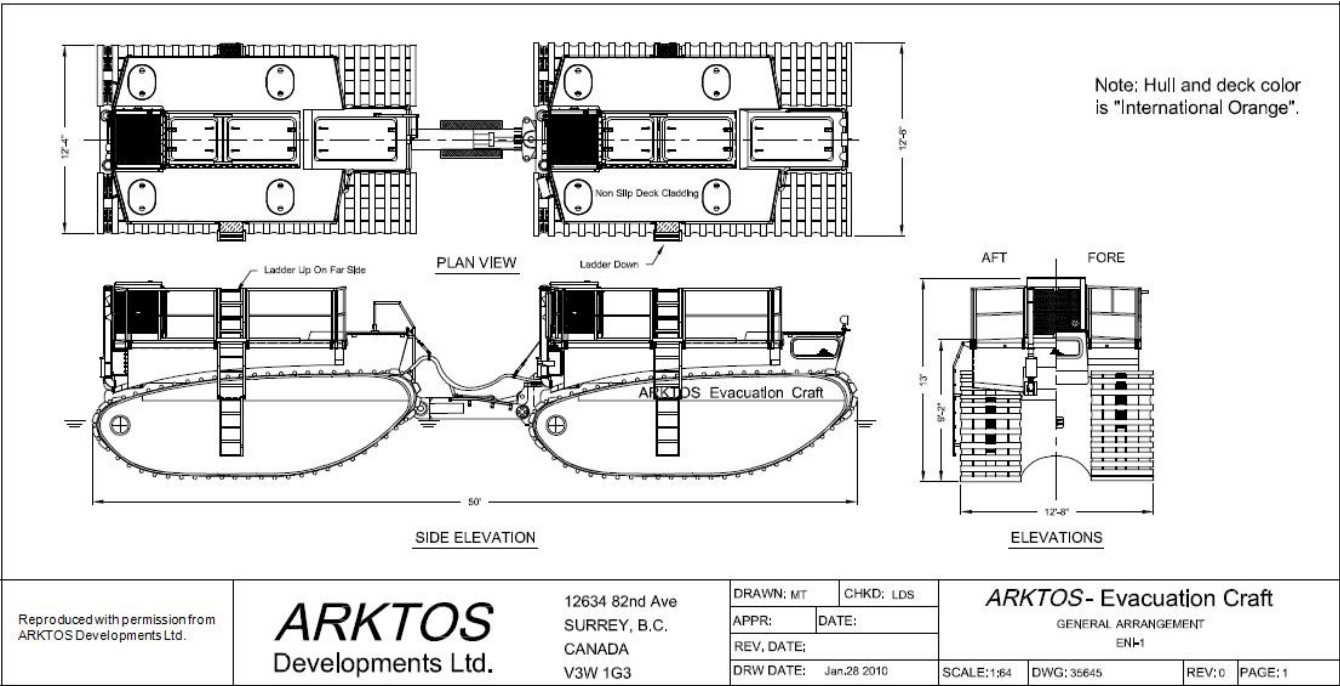


Figure 1. ARKTOS evacuation craft drawing.

The ARKTOS consists of a permanently linked pair of laminated e-glass/Kevlar-hybrid hulls. On land motive power is provided by a track system, and water jets for propulsion in the water. Each hull is independently powered by a diesel engine coupled to a hydraulic power pack to provide hydraulic power for both the waterjet and track system. A hydraulically powered articulation arm links the two hulls, or units, comprising the craft. Articulation control is achieved through a joystick allowing each unit to operate at independent angles with three axis of motion. The articulation arm improves the craft’s capability to negotiate the irregular terrain in ice-rubble fields, ice ridges, and floating ice. ARKTOS Development’s Ltd. holds patents in Canada and the United States of America on its system.

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AKTOS Developments Ltd. was able to arrange the use of an operational ARKTOS craft for the demonstration. The ARKTOS Craft used during the demonstration had additional external fuel tanks installed on the upper deck to extend its range. This was to enable the craft to transit to distant ice flows or be able to transit to the demonstration in Barrow from Prudhoe Bay if barge service proved unreliable. During the demonstration the operators estimated the displacement of the craft to be around 3 tons. The USCG certification for the ARKTOS Evacuation Craft is 68,510 lbs light ship and 81,410 lbs full load. ARKTOS Developments showed the demonstration team a design for a much smaller C-130 transportable craft, but the design is still under development.

The engine and hydraulic system relied on a radiator system located on deck for air cooling. The fan was powered by a hydraulic rotary actuator which resulted in high ambient noise levels on the top deck. In order to operate out of the water, the ARKTOS does not use seawater to cool any systems.

ARKTOS Evacuation Craft Particulars

Length Overall: 50.5 ft
Length of each Unit: 20.17 ft
Beam: 12.67 ft
Speed, Water: 5.3 kts
Speed, Land: 8.7 kts
Displacement, Lightship: 68,510 lbs (USCG Cert)
Engine, each unit: Cummins 6BTA
Horsepower: 260 BHP at 2800 RPM
Waterjet, each unit: Nomera
Fuel Tank: 2x 160 gallon tanks
Range: 70 nm

4.2 Tyler Rental, Inc.

Tyler Rental Inc's Alaska Amphibian MK-IV craft is based on results of three smaller prototype amphibious craft. According to the contractor's demonstration team, some of the previous smaller versions of this craft were capable of up to 30mph on land and in the water. The Alaska Amphibian MK-IV was constructed under a joint agreement at the Alaska Ship and Drydock, LLC facilities located in Ketchikan, Alaska.



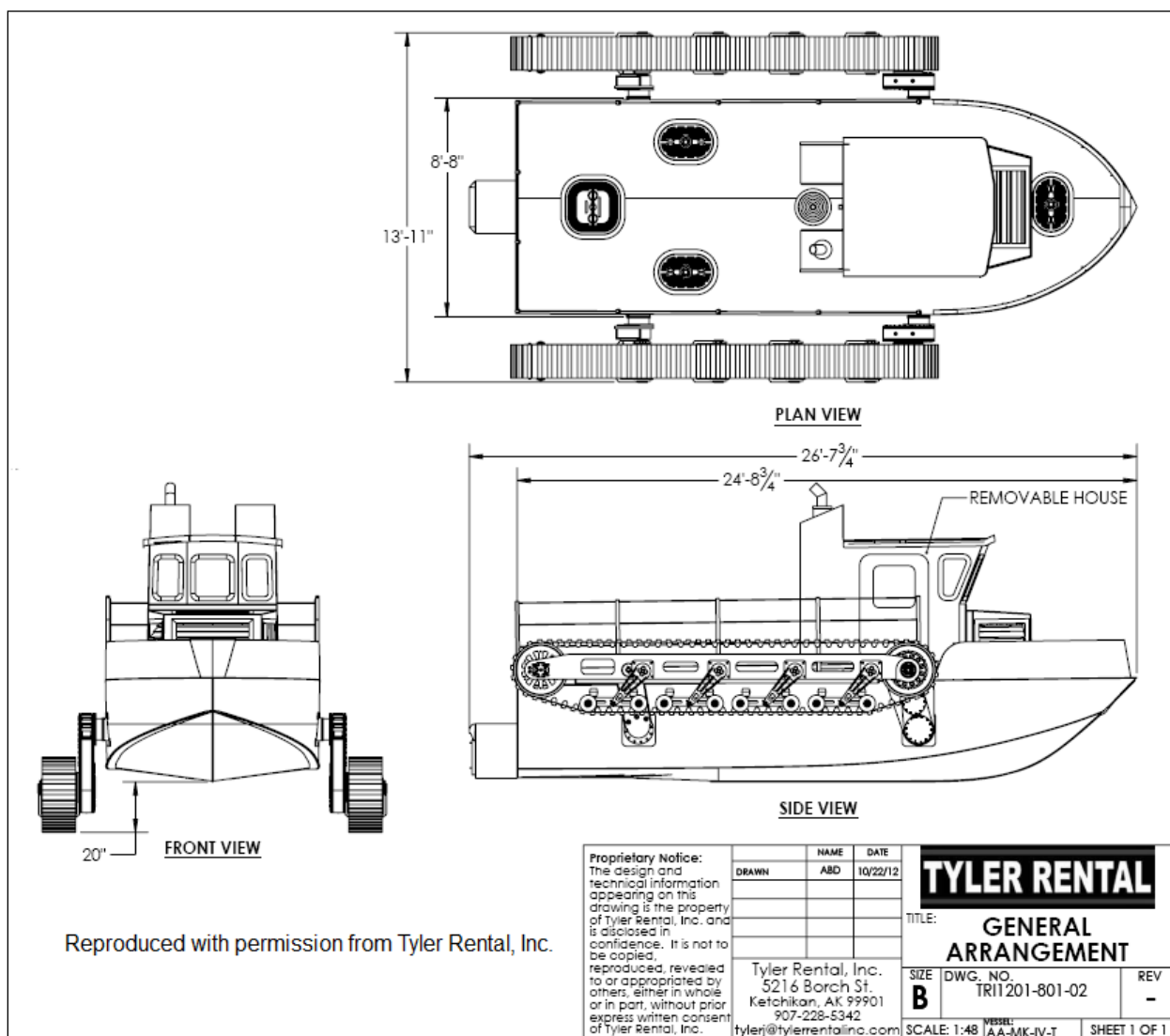


Figure 2. Tyler Rental's Alaska Amphibian MK-IV.

Tyler Rental's Alaska Amphibian MK-IV is an aluminum monohull with retractable tracts. For operations on land the tracts were rotated aft on hydraulic actuators. The hull was constructed from aluminum and featured a forward pilothouse and a flat deck area to the stern. This layout facilitates the use of modular components on the stern deck. The particular craft proposed by Tyler Rental was under construction at the time the BAA was released and it was completed shortly before the demonstration began. The initial estimates of craft performance were 15 knots in the water and 25mph on an improved roadway. The initial estimated lightship displacement was 12,006 lbs. According to Tyler Rental's demonstration team, the finished weight of the craft was approximately 16,000 lbs for this prototype but they believed they could substantially reduce the weight by improving the track system.

In order to be capable of amphibious operations, air cooling was used for the main engine and hydraulic system. The radiator cooling system was located on the fore deck in front of the pilot house.

Alaska Amphibian MK-IV Particulars

Length Overall: 26.64 ft
Beam of Hull: 8.67 ft
Beam with Tracks: 13.92 ft
Ground Clearance with Tracks: 1.83 ft
Speed, Water: 10 kts
Speed, Land: 13 kts
Displacement, Lightship: 16,000 lbs
Engine: Duramax 6.6L V8
Horsepower: 400 BHP at 3200 RPM
Waterjet: NAMJ TJ 381HH
Fuel Tank: 200 Gallons

5 ARCTIC CRAFT DEMONSTRATION

5.1 Demonstration Preparation

During the week of May 29, 2012, RDC personnel traveled to Barrow to meet local authorities concerning the upcoming Arctic Craft Demonstration. The RDC team met with Alaska Eskimo Whaling Commission (AEWC) both to ensure the demonstration would not interfere with their sustenance hunting activities and also to inquire about how they operate their boats in the Arctic. The AEWC Officials verified that the proposed dates for the demonstration were not an active sustenance hunting period. The team also met with Barrow Arctic Science Consortium, North Slope Search and Rescue, and personnel from the North Slope Borough Police Department. On the return trip the team split up and investigated both Nome and Deadhorse as alternate demonstration locations.

All Coast Guard participants in the demonstration were required to receive Cultural Awareness Training from District 17. The purpose of the training was to educate members on the unique socio-political environment in Alaska. Coast Guard demonstration participants were also required to complete Marine Mammal Observer Training. Contractor personnel were requested to review a PowerPoint presentation that contained information on identifying marine mammals and protected species. The training also reviewed avoidance procedures to be followed if wildlife was encountered.

5.2 Craft and Personnel Arrival in Barrow, AK

In order to get the Alaska Amphibian transported from the construction facilities in Ketchikan to the demonstration site in Barrow, Tyler Rental successfully implemented a complicated logistical plan. The craft first transited by Alaska Marine Highway System ferry from Ketchikan to Haines. The craft was then transported by truck from Haines to Anchorage to await air transportation. Tyler Rental arranged for Lynden Air Cargo's C-130 to transport the craft the last leg to Barrow. The maximum dimensions for the C-130 cargo hold were 8ft 9in height and an approximately 9ft in width. In order to get the craft to fit these dimension the tracks and cabin had to be removed from the hull. The hull and components were shipped on a modified 20ft International Organization for Standardization (ISO) flat that facilitated use of forklifts and other standardized container handling equipment. The craft and ISO flat were loaded onto another trailer supplied by Lynden Air Cargo to interface with the cargo hold of the aircraft.





Figure 3. Tyler Rental's craft loaded on Lynden Air's C-130 cargo airplane.

The Lynden C-130 with the craft onboard was flown to Barrow Thursday, August 9, 2012. To unload the craft in Barrow an IT28 Caterpillar Loader with forks was used. The craft was assembled on the tarmac at the airport in Barrow using the forklift to position the track assemblies and cabin. After the craft was reassembled it was driven away from the airport using its track system. During the demonstration the craft was kept overnight at the parking lot in front of the King Eider Hotel. To get to the public boat ramp the craft followed Ahkovak Street through town to arrive at the launch location. Before operating the craft on the roadway, contractor personnel discussed road travel with the North Slope Police and were instructed to have a vehicle in front and behind the craft with emergency flashers.



Figure 4. Unloading Tyler Rental's craft at Barrow Airport.

The ARKTOS craft used for the demonstration was leased back to ARKTOS Developments, Ltd. from the craft's current owner and was located near Prudhoe Bay Alaska. The craft was loaded onto a shuttle barge owned by Crowley Maritime Corporation that operates between Barrow and Prudhoe Bay during the ice free summer months. The barge does not operate on a fixed schedule; it travels between the two locations as often as possible depending on loading and transit durations. The contractor had installed additional fuel tanks on the topside of the ARKTOS to enable them to transit the approximately 150 nm in case the barge was unavailable for timely delivery. This was not required for the demonstration. The ARKTOS arrived in Barrow on August 9th and was stored at the former Naval Arctic Research Laboratory (NARL) site in a building currently owned by UMIAQ, LLC, a division of the local Alaska Native Corporation, UIC.

Coast Guard participants generally arrived for the demonstration on August 11th and 12th. During the summer months, the few flights into and out of Barrow can be fully booked well in advance. Last minute tickets and schedule changes usually cannot be accommodated. Barrow's Wiley Post – Will Rodgers Memorial Airport is served by a number of air carriers. Many of the smaller planes are affected by adverse weather conditions. It was the demonstration group's experience that the major airline operating larger jets provided more reliable service in adverse weather conditions.

5.3 General Operating Conditions

The Arctic Craft Demonstration took place in Barrow Alaska during the week of August 13, 2012. The primary demonstration location had previously been determined to be the public boat ramp in Barrow. This location was selected because it was already regularly transited by local boaters and the operations of the demonstration craft would have minimal additional impact. During the week the craft operators typically used the beach to either side of the ramp to launch and land their craft. Although craft usually launched from the beach, the boat ramp was measured and it was determined that it was too narrow to accommodate either craft. The beach in Barrow is composed of various sizes of small pebbles mixed with sand and silt. This composition makes the beach very soft in areas, and at times, difficult to walk on. Neither craft had any problems moving into and out of the water or along the beach. During the demonstration a number of local truck, motorcycles, and ATVs were seen driving on the beach. The tidal range in Barrow was estimated to be approximately six inches and did not have any major impact on the demonstration activities.



Figure 5. City of Barrow public boat launch.

At times during the demonstration large ice flows were visible on the horizon moving parallel to the beach in a northeasterly direction. Using rough line of sight approximations, it was estimated that if the ice could be seen it was between five and eight miles from the shore. One of the main objectives of this demonstration was to evaluate craft's performance in and around ice. It was decided that if weather conditions were favorable, the craft's operator was comfortable, and with the Safety Officer's approval, the craft would be allowed to transit to the ice to demonstrate their capabilities. According to local knowledge, the ice general moves in the direction of the current until the wind speeds exceed 10-15 kts at which time the ice movement is heavily influenced by wind direction.

During the demonstration utmost consideration was given to the safety of marine life near the demonstration site. The demonstration had a designated marine mammal officer whose responsibilities included determining how to reduce the risk of a marine mammal encounter, reviewing all marine mammal procedures, and to be the point of contact for reporting marine mammal sightings. A marine mammal watch stander was assigned to each craft in addition to a dedicated safety/marine mammal watch stander stationed on the beach near the operating location during all craft operations. When indications of marine wildlife activity were observed, operations were either relocated or suspended.

Craft operations were also careful of not interfering with local sustenance hunting activity. While demonstration craft were operating near the Barrow Public Boat Ramp, a number of local craft were launched to engage in hunting and fishing activities. Many of the local craft were transiting to the ice flows or distant locations and no local boaters indicated the demonstration was interfering with their activity.

Since the demonstration featured very unique craft and was executed in high profile locations it received a lot of attention from the local population. Demonstration personnel, both Coast Guard and contractors, were asked to be receptive to the local population and their comments and concerns. There were typically a large number of local residents gathered when the craft were on the beach. There were also a number of local representatives that were allowed onboard by the contractors during and after demonstration activities. At all times during the demonstration, participants were polite, knowledgeable, and responsive to requests.

Before operations began each day a safety meeting was held at the designated launch site. The decision would be made to operate or not based on forecasted weather conditions, crew health, and equipment operability. Marine mammal watch standers were designated and crew assignments were made at the morning safety meeting.

In accordance with Coast Guard requirements, all Coast Guard personnel were required to wear drysuits, life jackets, insulated boots, and boat crew survival vest while underway on the Arctic craft. This PPE requirement is outlined in Commandant Instruction Manual 10470.10F: Rescue and Survival Systems Manual. There was some difficulty in acquiring this equipment beforehand since many of the CG participants were not attached to a cold weather boat station so it had to be either borrowed or purchased. Although strongly recommended, contractor personnel were not required to wear drysuits. During the demonstration all personnel wore appropriate personal flotation devices.

The first few days of the demonstration the USCGC SYCAMORE was anchored offshore of Barrow. The SYCAMORE regularly used its cutter boats to transfer personnel from ship to shore. Because there were no piers in the area, the cutter boat crews had to beach their boats and personnel were required to go over the bow onto the beach.

5.4 Monday, August 13

The first day of the demonstration was Monday, August 13th. All demonstration personnel and contractors met at the primary demonstration location, the Barrow Public Boat Ramp, for a kickoff meeting followed by a safety briefing. The Safety Plan was reviewed with the contractors including marine mammal and sustenance hunting avoidance procedures. In accordance with the Safety Plan, a Green Amber Red (GAR) Risk Assessment was conducted by the Safety Officer that resulted in a score of 33 which was in the caution zone. Risk factors contributing to the elevated GAR score were the unique craft being used, operation in unfamiliar areas, and cold water temperatures.



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Since the craft were initially located in two separate locations, the USCG personnel participating in the demonstration were split into two teams to conduct a visual inspection of each craft before operations began. After successful completion of the visual inspection both craft had to transit to the primary demonstration location. Tyler Rental's craft, arrived by driving down the road in track mode and the ARKTOS launched and arrived at the location by sea. The ARKTOS was being stored in a Quonset hut that was previously part of the NARL facility. The storage location was approximately five miles up the beach from the Barrow Public Boat Ramp and the ARKTOS craft required an hour to transit to the primary demonstration location. The weather conditions were sunny with a light breeze. Occasional whale spouts were sighted in the distance but not close enough for mammal identification or to impact operations. Both craft were requested to make initial trail runs just offshore demonstrating their seaworthiness and craft operability. These included speed trails, turning patterns, and multiple landings and launchings. After these initial trial runs, at about 1300, both craft were authorized by the on shore Safety Officer to travel the estimated five miles to the ice fields that were clearly visible from shore. However, as the craft transited towards the ice it began to retreat away from the beach. Tyler Rental's craft demonstrated a top speed of 9.9 knots underway while the ARKTOS was making 5.0 kts through the water. After traveling approximately 9 miles from shore, both craft reached the ice fields. The ice field was composed of various sized broken ice from basketball sized to approximately one acre in surface area. The ice encountered in this ice field was all first year ice with relatively flat surface on top.

In accordance with the Safety Plan, both craft were required to stay in contact with the Safety Officer located on the beach while they transited to the ice flows. The safety officer was using an Icom M-88 handheld VHF radio while both craft had mounted marine VHF radios onboard. VHF radio communications were lost with the craft when they were approximately 5 miles from shore. After VHF communications were lost the Safety Officer was able to contact the craft on cell phones. Cell phone voice communications failed when they were approximately 7 miles from shore. They next tried to communicate with text messaging. The Safety Officer on the beach was able to receive messages from the craft but personnel on the craft did not receive any of the texts from the safety officer until approximately 0200 the next morning when they all came in at once. When VHF communications were lost and cell phone communications were being used, the safety officer requested that the Coast Guard Communications Detachment Barrow establish communications with the craft using their more powerful radio and higher antennae. The communications detachment was able to successfully establish two way communications with the craft which could be overheard by the shore side Safety Officer. While on the ice the demonstration craft were spotted by the NOAA hydrographic ship FAIRWEATHER. The ship approached the ice flow and established VHF radio contact to ensure the demonstration participants were not in distress.

The ARKTOS craft was able to demonstrate its ability to climb on top of the larger ice slabs. If the ice field had to be transited it would require the craft to be able to climb on top of the ice. Although leads existed in the outer edges of the ice, no single lead was visible through the ice field. The geometry of the ice combined with wind and currents moved the ice around in unpredictable ways.





Figure 6. ARKTOS Craft climbing on top of an ice flow.

While operating in the ice fields, Tyler Rental's craft made some attempts to climb onto the ice but was unsuccessful. It should be noted that the craft was not designed for this purpose nor was this a stated capability of the craft. However, most evaluators who witnessed the craft attempting this capability thought that if the track incorporated ice spikes or cleats it would have been able to climb on top of the ice. The Ice sheet the craft attempted to climb onto had an approximate ledge or lip of 18 inches to overcome. It was also noted that when lowering the craft's track that they rotated towards the aft end of the craft. Demonstration personnel theorized that if the tracks rotated forward it could assist the craft in climbing onto the ice.



Figure 7. Tyler Rental's Craft operating in ice fields off Point Barrow.

After approximately 45 minutes of operations in the ice fields both craft began their return journey. The Alaska Amphibian returned to the beach at 1730 and deployed its tracks and traveled up Ahkovak Street to its storage location. The ARKTOS craft made landfall near the NARL facility at approximately 1930. The crew gathered for a quick debrief after which the demonstration was secured at 2000.

5.5 Tuesday, August 14, 2012

The safety meeting for the second day of the demonstration was held at 0700. The weather conditions had deteriorated some with light rain and dark, overcast skies. The marine mammal officer indicated that he had received reports of increased marine mammal activity in the area and all craft should proceed with caution. Crew and watch stander assignments were made and the demonstration commenced. Because the CG personnel were conducting simultaneous demonstrations, boat crews were continually rotated so each member of the demonstration team could evaluate the performance of each craft.

In order to maximize the demonstration time, the ARKTOS crew traveled to their storage site and conducted testing activities as the craft transited to the primary demonstration location. A sound survey was completed on the AKTOS craft using handheld sound level meters. The instruments recorded a 99 decibel reading on the deck near radiator of the unit and a 92 decibel reading inside the hull with engines at cruise speed. The ARKTOS crew used headsets with push to talk functionality for all communications. This allowed the operator in the front unit to communicate with crew in the rear unit and crew members on deck that were wearing a headset. The ARKTOS craft also completed some maneuvering test including astern operations. Because the craft uses a rotatable waterjet it was easily able to redirect its thrust and make up to 3 knots traveling astern.





Figure 8. ARKTOS Craft landing on the beach.

The Alaska Amphibian demonstrated its capabilities in track mode on the beach near the boat ramp. The craft reached a top speed of 13 knots on the beach sand. The craft was able to easily navigate soft sand, loose gravel, and uneven terrain at relatively high speeds. It also demonstrated the ability of its track systems to traverse a log on top of the sand at maximum speed. In the afternoon the Alaska Amphibian suffered a seal failure in the rear differential. Tyler Rental's crew worked on the system that evening but was not able to perform a complete repair to the differential because the necessary parts were unavailable in the area. However, the craft was able to continue with the demonstration. Without a working differential the craft had to be stopped and the water jet shaft to be manually connected when entering the water, then disconnected when exiting the water. The waterjet is water lubricated so when the craft was started up with the waterjet engaged squealing sounds and vibrations were experienced until the waterjet was able to ingest water and be adequately lubricated.



Figure 9. Alaska Amphibian traveling along the beach.

The afternoon operations drew a large crowd on the beach and significant time was spent talking to and educating the local residents about both the Coast Guard in general and the demonstration specifically. With the exception of one comment, all feedback was positive and the local residents were very interested in our activities. One local resident stopped and told the demonstration team that the activity of the demonstration craft was eroding the beaches and to “tell the Admiral to keep his boats in the ocean.” When this comment was passed on to community leaders they indicated there was no problem with beach erosion in that area and the beach was regularly transited by local resident’s trucks and ATVs.

5.6 Wednesday, August 15, 2012

The third day of the demonstration began with a safety briefing at 0700. The weather was very overcast, with light rain and forecast was for increasing winds and rain throughout the day. There was no ice visible on the horizon. The NOAA ship FAIRWEATHER was spotted holding station offshore. The ship was raised on VHF radio and asked if they had any information on the ice flow location, which they did not. Later in the day the FAIRWEATHER’s launch was seen operating in the area. The Alaska Amphibian transited to the launch site on its tracks and then had to shut down near the water’s edge to manually engage the waterjet. Once in the water the craft preformed additional maneuvering test. Other than additional time to transition between land and water, craft performance was not negatively affected.

Arctic Craft Demonstration Report

The CG crew assigned to the ARKTOS traveled to their launch site near NARL and used the transit to the boat ramp as an opportunity to do additional maneuvering test. See Figure 10 below for a GPS plot of the maneuvering test of ARKTOS that morning. Just before lunch an individual from the North Slope Borough Department of Wildlife Management stopped by and told the demonstration team that it needed to move their activities a few miles up the beach towards the NARL facility because beluga whales were in the area and they might be scared further offshore. He stated that the local sustenance hunters prefer to hunt them close to shore. He also asked if he and his associated could come aboard for a ride and accompanied the ARKTOS to its storage location near NARL. For the rest of the demonstration, all near shore activity was relocated to near the NARL facility approximately 5 miles up the beach from the boat ramp.

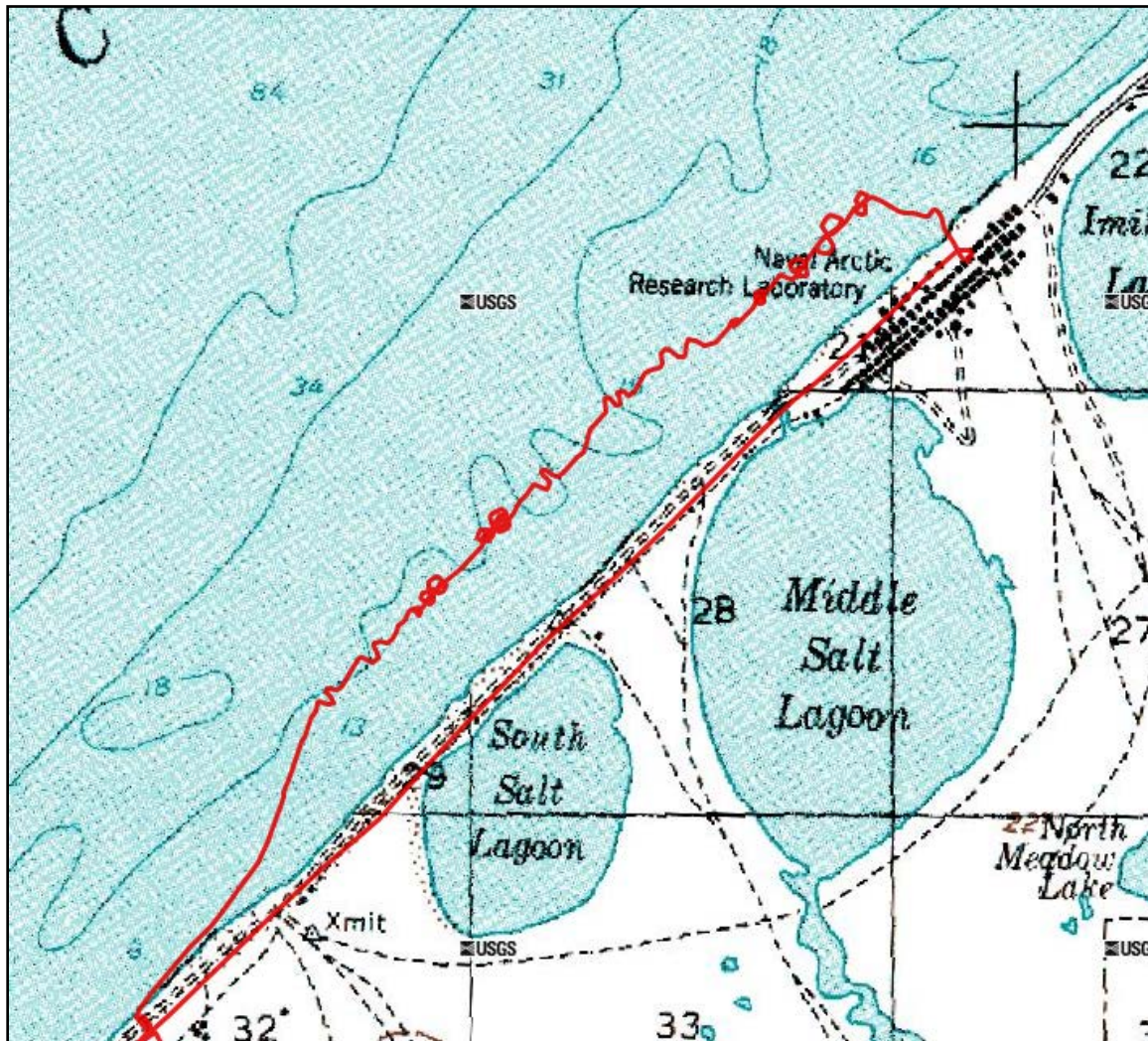


Figure 10. GPS track showing maneuvering testing of ARKTOS on Wednesday.

Operations were ended at approximately 1300 on Wednesday due to an incident at the Coast Guard Communications Detachment.



5.7 Thursday, August 16, 2012

The fourth day of the demonstration began with a safety briefing at 0700. The weather was good with overcast skies and light winds. The ice flows were clearly visible on the horizon. After discussion with ARKTOS Developments Ltd, it was decided that they would again transit to the ice field for additional demonstrations of their capabilities in floating ice flows. In addition to CG demonstration participants, the contractor also allowed a film crew from Coast Guard Alaska to come aboard. Due to the previous minor mechanical issues with the Tyler Rental craft, it was decided by the safety officer and agreed by contractor personnel that it was an unnecessary risk to have the craft travel out to the ice flows. The Tyler Rental craft conducted their demonstration activities near shore.

The ARKTOS began the transit to the ice field at approximately 1000. Because the craft was traveling with the current, the GPS was displaying a speed over ground of between 8 and 10 knots. Approximately four miles from shore the engine throttle linkage failed in the forward unit. This linkage failure brought the engine to an idle and was unresponsive to throttle movements in the cabin. The problem was quickly identified and the cable linkage was re-crimped. During the repair the rear unit continued to provide thrust that allowed the craft to make forward progress at a reduced speed. While the ARKTOS was transiting to the ice field, it was observed that the field was moving away from the craft. Communications Detachment Barrow provided a radio guard during the transit. Even at the maximum distance from the communications tent, approximately 12 nautical miles, there was clear VHF radio communications.



Figure 11. Multiyear ice field encountered Thursday August 16 off Point Barrow.

The condition of the ice encountered on Thursday was noticeably different than the ice found offshore on Monday. The ice was a darker blue color and very uneven on the surface. Some areas of the ice were darkened and appeared to contain pebbles and soil. Based on these observations it was concluded that the ice was most likely multiyear ice. Once in the ice, the ARKTOS again demonstrated its ability to climb onto the ice slabs that were big enough to support its weight. The ARKTOS also demonstrated the ability to transit through or over an ice field comprised of smaller ice chunks with no difficulty. After 45 minutes of operations in the ice, the decision was made to return. The current around the point was moving at 4.5 knots parallel to the beach in a northeasterly direction. The return transit against the current took approximately five hours. When the ARKTOS pointed directly into the current it made as little as half a knot toward its destination. In order to get out of the current, the craft traveled perpendicular to the beach until it got closer to the shore where the strength of the current was reduced. The ARKTOS craft returned to the storage facility at 1900 hours and operations were secured for the day.

The Alaskan Amphibian craft transited to Point Barrow and back staying near the shore. By the afternoon CG personnel on the Tyler Rental craft had completed all their demonstration activities and operations were concluded.

5.8 Demonstration Conclusion and Craft Departure

Although the Period of Performance for the Arctic Craft Demonstration extended until Friday August 17th, all the goals of the Coast Guard demonstration team were completed by Thursday, so it was decided to allow the contractors to use the remaining time to demobilize. On Thursday afternoon Tyler Rental dismantled the necessary components of their craft so it could be transported back to Anchorage aboard Lynden Air Cargo's C-130. The cabin and treads were easily removed with minimal personnel and tools. The craft's components were then packed back on the 20 ft ISO flat. The ARKTOS craft continued to provide VIP demonstrations to local dignitaries after the RDC's Arctic Craft Demonstration was concluded. The craft notified the barge operator and was on standby for the next available barge transit to Prudhoe Bay, space permitting.



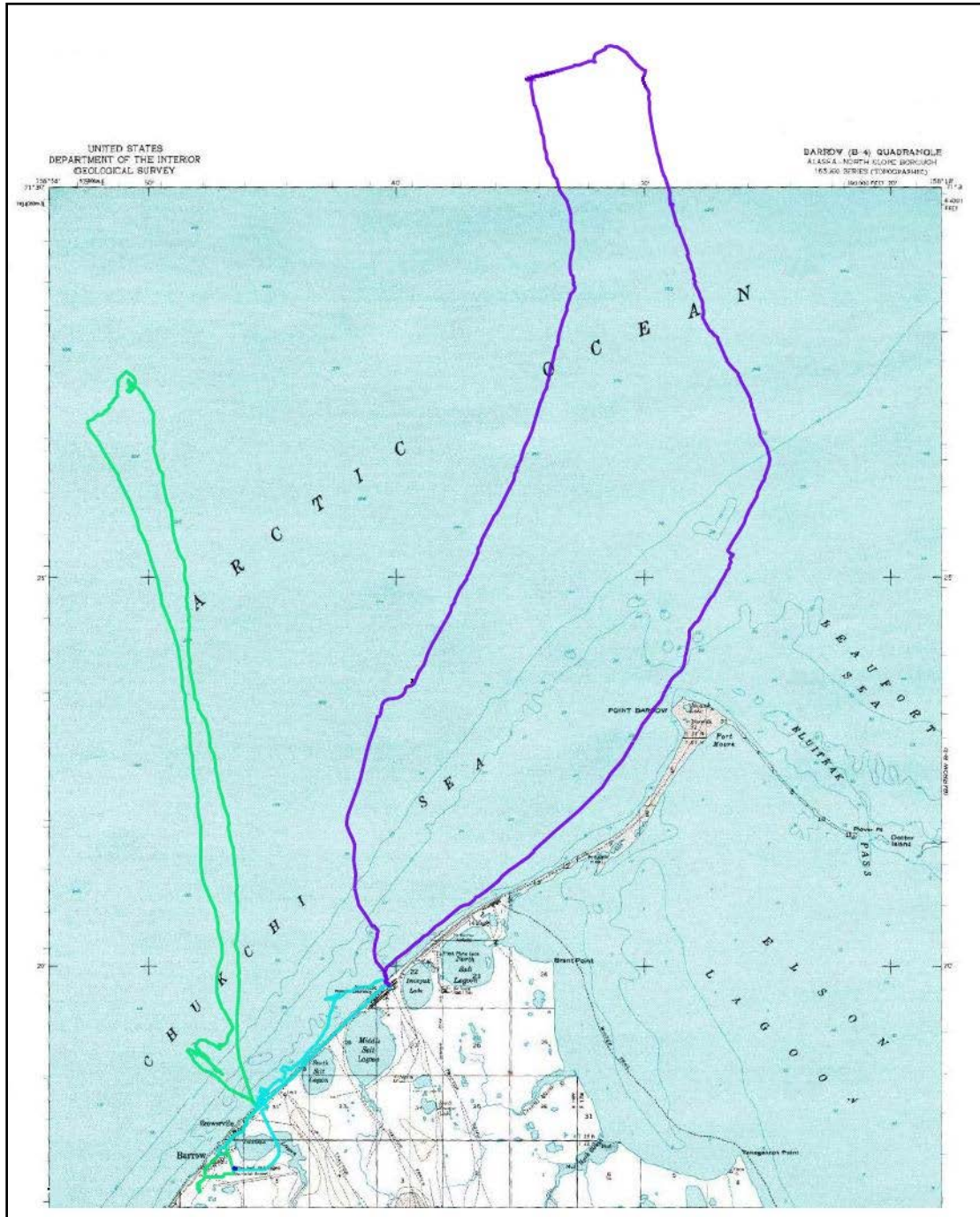


Figure 12. GPS tracks of Arctic Craft Demonstration.

Figure 12 above shows a plot of the GPS data recorded during the demonstration. The green track was the Alaskan Amphibian's course on Monday the 13th and the purple track was the ARKTOS's course on Thursday the 16th. The abrupt course changes at the top of the tracks indicate when the craft were into and on top off the ice flow and were travelling with the strong current around Point Barrow.

6 ARCTIC CRAFT IN PRUDHOE BAY

6.1 Vessels Observed

In addition to the Arctic Craft Demonstration held in Barrow, team members from SFLC-ESD and the RDC traveled to the Prudhoe Bay area the last week of September 2012 to investigate Arctic craft operations in that area. Prudhoe Bay is home to North America's largest oil field. Many different types of craft are operated for logistical support and kept on standby for oil spill response.

One of the largest boat operators on the North Slope is Alaska Clean Seas (ACS). ACS is an oil spill response cooperative that provides material, personnel, and equipment to its members in the event of an oil spill. ACS current area of operations includes large areas of the North Slope and the first 167 miles of the Trans-Alaskan Pipeline. In order to provide adequate response, ACS maintains a fleet of approximately 96 vessels.

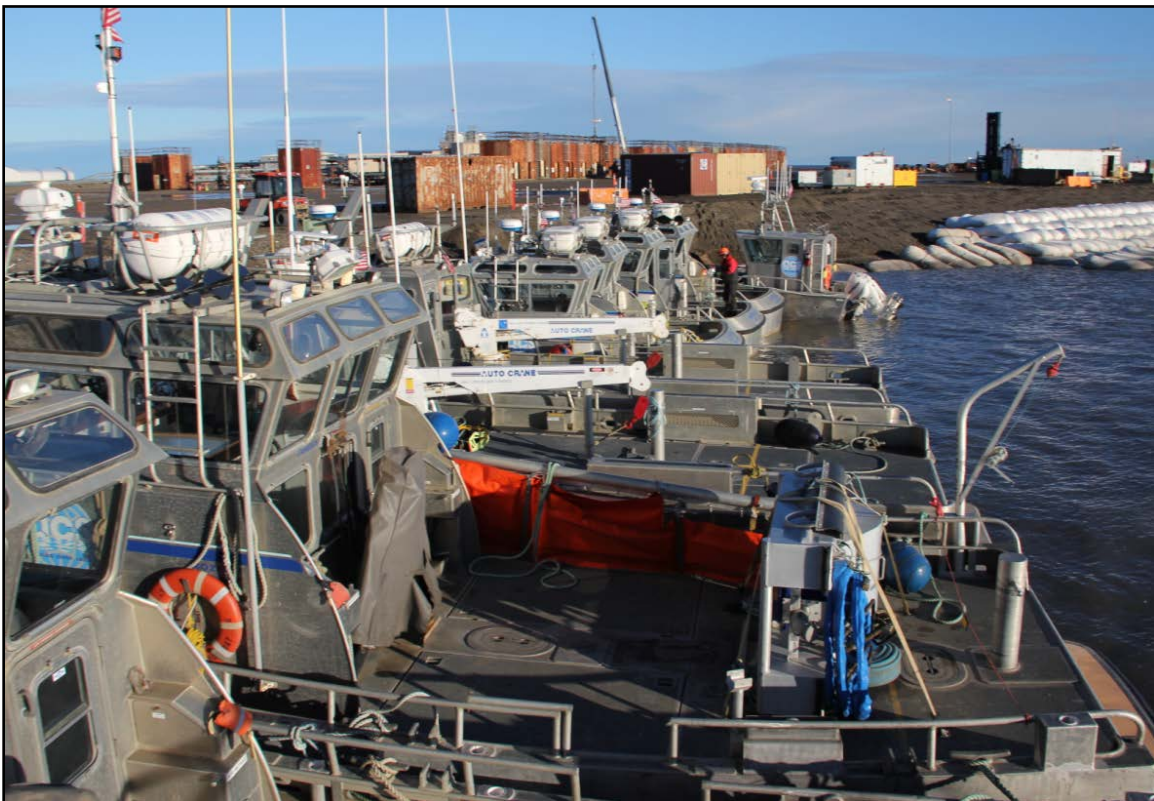


Figure 13. Alaska Clean Sea's boats at West Dock, Prudhoe Bay.

One of the most important items that repeatedly came up during conversations with the operators was ensuring adequate heat was provided inside the cabin. One of the items found on the new acquisitions is a heated tempered glass windshield that provides improved visibility in snow and ice. Operators indicated they believe the range of VHF communications is reduced in the high latitudes. ACS uses a network of VHF boosters and repeaters to provide good coverage over their area of operations. ACS does not paint their hulls because of the relatively short season and because marine growth is abated in the cold water temperatures. ACS's Bay Class boats (built by Rozema Boat Works) incorporate an ice belt of thicker aluminum at the

waterline for increased strength in the most likely area of ice impact. Many of the aluminum boats also have sprayed urethane foam insulation on the inside of the hull in areas where practical. This insulation was added by ACS during an availability period.



Figure 14. ACS boat propeller shroud.

ACS also operates a number of airboats, but they are mainly used for oil spill response in the river areas and rarely travel out into Prudhoe Bay. Prudhoe Bay and much of the surrounding area are extremely shallow. ACS's larger boats are said to regularly come in contact with the bottom. This is not due to operator error, but rather standard operating procedure in these areas. Highly accurate charts are usually not available and the depth and bar locations in the shallow bays are constantly changing. As seen in Figure 14, their propeller driven craft incorporate substantial shrouding for the propellers and rudders to provide protection. During a typical year, ACS will begin hauling out its boats during the first week of October. Winter weather usually begins that month with high winds creating a steep chop on top of a northerly swell. When the seawater begins to develop slush ice the waterjet propelled boats are removed because they have difficulty operating in that ice condition. Usually the prop boats are kept in the longest depending on the local ice conditions.

The team also met with Crowley Maritime Services which operates the Arctic Hawk Air Cushion Vehicle (ACV). This vessel is used to provide logistical support to offshore structures in and around the Prudhoe Bay area. The use of an ACV is most beneficial between when the ice starts to form and boats are pulled from the water and before there is adequate ice thickness to build an ice road. When pressure ridges develop on the frozen ocean the ACV is required to transit around them which can result in considerably longer voyages than expected.



Figure 15. Crowley ACV on a beach in Gwydyr Bay.

The Arctic Hawk operates year round out of a coated fabric Quonset hut with large roll up doors on each end. This allows the ACV to drive through the facility in one direction for both launching and when returning to its storage facility. Similar structures could be erected to support Coast Guard missions in Arctic areas with limited infrastructure. Figure 16 below shows the Quonset hut like structure located in the West Dock area of Prudhoe Bay.



Figure 16. Quonset hut structure allows year round operations for ACV.

6.2 Additional Information on Prudhoe Bay

Prudhoe Bay is unique among the villages of the Arctic in that it is considered a “company town” because it has few permanent residents but houses up to 5,000 transient employees of the oil and gas industry. It is also the only town on the North Slope that can be reached by road. Alaska’s Dalton Highway begins at Fairbanks and runs 414 miles to Deadhorse. The Dalton Highway is the only road to the North Slope and is open year round. It receives most of its traffic during the winter months when the frozen roadway can handle heavier loads. During the summer months the road conditions can vary greatly as many sections of the highway are unpaved. Most of the highway passes through uninhabited wilderness. The closest service station to Deadhorse is 240 miles away. Coast Guard boats could be transported on this road but might require special cribbage and protection from flying gravel. The road terminates in Deadhorse, which is approximately ten miles from the sea. All of the land providing access to the sea from Deadhorse is private property controlled by various energy companies. There are two main facilities in Prudhoe Bay for boat operations. East dock is the older dock which is no longer used due to shallow water and West Dock where the ACS fleet and Crowley’s ACV are located. Despite their name there is no actual dock at either location, just a spit of land where boats are beached. In order to reach these facilities you have to travel through a number of security checkpoints. The CG team was only granted access with pre-approved authorization and identity verification with their government issued Common Access Cards (CAC).



Figure 17. Dalton Highway near Deadhorse, AK.

7 LESSONS LEARNED

There were multiple lessons learned during the Arctic Craft Demonstration on the North Slope of Alaska. Many of the participants had never operated craft in the Arctic before this demonstration. The following information learned during this demonstration could be helpful for future efforts as the Coast Guard increases its presence in the Arctic.

7.1 Logistics

- There is very limited infrastructure to support boat operations in Northern Alaska. No deepwater ports or piers are available. The most northerly port is located in Nome, which is over 500 miles away through the Bering Strait.
- Barge transportation to distant Arctic communities from Seattle usually only occurs once a year in the summer months. Most communities can not be reached by road. Craft that are air transportable in CG C-130s will greatly increase their effectiveness.
- It is important to develop good relations with the local government, community leaders, tribal elders, and the local population in general. Information should be provided so they understand our goals and it's important to listen to their comments and suggestions because they have an immense understanding of the Arctic environment.
- Logistics Plans should include having available significant amounts of spare parts and maintenance materials to ensure mission readiness.

7.2 Operations

- The comparatively low speeds of the demonstration craft would have a negative impact on the Coast Guard's ability to quickly transit the vast distances encountered in the Arctic.
- Limited navigational information is available to boat operators in the Arctic. Offshore currents can be significant. Charts are often display old hydrographic data and can be inaccurate.
- Boats will not be able to operate in the ice fields unless they have the capability to climb out of between the ice slabs when open water leads close. The size of the ice fields encountered during the demonstration is unknown, but they stretched across the entire horizon.
- System redundancy should be incorporated into the design of any craft operating in the remote and harsh Arctic environment.
- Communications in high latitudes can be difficult. It is commonly believed VHF radios will have less range when used in the higher latitudes. A system of relays and repeaters may be necessary for effective radio communications.
- The majority of Arctic craft operated by local residents are standard outboard powered monohulls with few if any modifications for Arctic use. These craft are only used in the short open water season usually for sustenance hunting and fishing activities. Snowmobiles are used to transit the frozen ocean. Intensive manual effort is exerted to cut and smooth paths through pressure ridges on the ice.
- Weather forecasts are available from the National Weather Service, but there are limited resources available for developing them, resulting in inaccurate long term forecast. Currently there are no weather radars operated by the NWS in the Arctic.
- Simple design and easily repairable systems will maximize operability.



- Due to the lack of infrastructure, it is usually standard procedure to beach Arctic craft during their regular operations. The CG does not regularly beach its boats in any other AORs.

7.3 Safety

- Dry suits will be required for all CG boat crews operating in the Arctic. This will affect the human engineering aspect of boat controls, seats, and passageways.
- Ice fields, wind and current driven ice packs, short open water season, and quickly developing high sea states pose significant environmental hazards while operating off the North Slope.
- Boats in the Arctic Ocean could encounter ice at any time. Even though the demonstration took place in August there were numerous broken ice flows in the area. Currents and wind can alter the course of the ice flows which could be encountered anywhere from the beach to the ice cap, which can be hundreds of miles from shore.



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APPENDIX A. ARCTIC CRAFT DEMONSTRATION BAA

BROAD AGENCY ANNOUNCEMENT (BAA)

BAA NUMBER: HSCG32-12-R-R00010

Arctic Craft Demonstration

United States Coast Guard (USCG)
Research and Development Center (RDC)
1 Chelsea Street
New London, CT 06320

See FAR 3.104

This document contains source selection information related to the conduct of a Federal agency procurement, the disclosure of which is restricted by Section 27 of the Office of Federal Procurement Policy Act (41 U.S.C. 423). The unauthorized disclosure of such information may subject both the discloser and recipient of the information to contractual, civil, and/or criminal penalties as provided by law.



Arctic Craft Demonstration Report

INTRODUCTION

This announcement constitutes a Broad Agency Announcement (BAA) in accordance with Federal Acquisition Regulation (FAR) 6.102(d)(2). No Request for Proposal (RFP), solicitation, or other announcement will be made. This announcement constitutes the only solicitation. The U.S. Coast Guard (USCG) Research and Development Center (RDC) will not issue paper copies of this announcement.

The RDC reserves the right to select for award and fund all, some, or none of the proposals in response to this announcement. The RDC provides no funding for direct reimbursement of proposal development costs. Technical and Cost Proposals (or any other material) submitted in response to this BAA will not be returned. The RDC treats all proposals as sensitive competitive information and discloses their contents only for the purposes of evaluation.

I. GENERAL INFORMATION

1. Agency Name

U.S. Coast Guard Research and Development Center
1 Chelsea Street
New London, CT 06320-5506

2. Research Opportunity Title

Arctic Craft Demonstration

3. Program Name

Arctic Craft

4. Research Opportunity Number

HSCG32-12-R-R00010

5. Response Date

Proposals due 16 March 2012

6. Research Opportunity Description

6.1 Background

As the multi-year ice within the Polar Regions recedes, the Coast Guard (CG) is preparing for the possibility of increased operations within the Exclusive Economic Zone (EEZ) north of Alaska. It is anticipated that these operations, in the Arctic environment, will fall within nine of the 11 statutory CG missions. The nine are; Aids to Navigation, Defense Readiness, Ice Operations, Living Marine Resources, Marine Environmental Protection, Marine Safety, Other Law Enforcement, Ports, Waterways, and Coastal Security, and Search and Rescue. A general description of the missions can be found at <http://www.uscg.mil/top/missions/>. Counter-Drug Interdiction and Alien Migrant Interdiction operations are currently not included. In the non-Polar regions, these same nine missions are typically accomplished by Coast Guard's boat stations and Coast Guard boat crews operating the Response Boat Medium (RB-M).



To accomplish the nine missions in the Arctic, the CG Arctic Craft will need to have certain capabilities uniquely suitable for this challenging environment because the operational environment of the north slope of Alaska is significantly different from the non-Polar environments where the Coast Guard boat crews currently operate. Differences include the varying ice conditions encountered, extreme cold, a silted ocean floor, high waves that build quickly, and a lack of any infrastructure to support operations. Current Coast Guard boats, such as the RB-M, have not been specifically designed for these conditions. The RB-M is an aluminum, self-righting, high-speed, multi-mission capable boat, operable from non-Polar shore stations. In addition, there are a number of logistical issues unique to the Arctic. For example, all equipment used by the Coast Guard is transported by C-130 aircraft due to lack of transportation infrastructure. In addition, Arctic Areas of Responsibility (AORs) are typically located in geographic areas that are so remote that traditional maintenance on the craft may not always be accomplished at the recommended intervals. This can be caused by lack of equipment, lack of a maintenance facility, limited supplies and other logistical hurdles.

Currently the Coast Guard is conducting research to identify Arctic Craft that are fully capable of performing similar functions to those that are traditionally preformed by RB-M type craft, which are able to respond rapidly to Coast Guard missions, or conduct planned patrols and training in non-Polar CG AORs. Some of these functions include: search and rescue, recovery of persons from the water, transfer of persons and equipment from boat to boat, towing of disabled craft, transfer of persons to and from CG helicopters, medical assistance, fire fighting and rescue assistance, recreational boat safety, marine environmental protection, enforcement of laws and treaties, port security and safety, and defense operations and contingency preparedness. The difference would be to perform these similar functions while operating in the Arctic's shallow waters and among ice floes while insulating the crew from the inherent cold weather environment. Further, the Craft needs to be able to accomplish the missions while operating in the north and northwest Alaska coastal areas where the maritime infrastructure lacks developed boat ramps and piers.

Construction of such ramps and piers is impractical due to the extreme environmental conditions and constant movement of silt and ice along the coast. Boats used in this region are primarily launched directly from the shore. The waters along the North Slope are shallow near the beach and remain shallow for a considerable distance off shore. To further exacerbate this problem, the seafloor is comprised of very fine silt particles that are easily taken into mechanical systems operating in the waters. Finally, the strong winds and unimpeded fetch result in significant wave height. It is anticipated that the CG will not attempt to build infrastructure in the near future. Therefore the CG is looking for Arctic craft that can overcome these operational and logistical obstacles.

Because of the multi-mission nature of the CG and its operations, craft that can perform a significant number of the nine statutory CG missions anticipated in the Arctic are of the most interest. At this time the CG does not have craft capable of efficiently and effectively supporting multiple operations in the Arctic environment on a level equivalent to that of the RB-M in other AORs. It is highly unlikely that there is one craft that will effectively support all CG mission requirements anywhere let alone the extreme environment of the Alaskan Northern Slope. Under this BAA, the Coast Guard is seeking to demonstrate innovative craft that have the best combination of capabilities to accomplish the broadest range of CG mission objectives in the Arctic Environment.

6.2 Scope

The scope of this BAA includes the demonstration of an Arctic Craft on the North Slope of Alaska to be witnessed and evaluated with regards to its capabilities for performing CG missions in an Arctic environment with the intent to increase the CG's knowledge and understanding of the effectiveness of the various technologies and the techniques and procedures for operating craft in that environment.



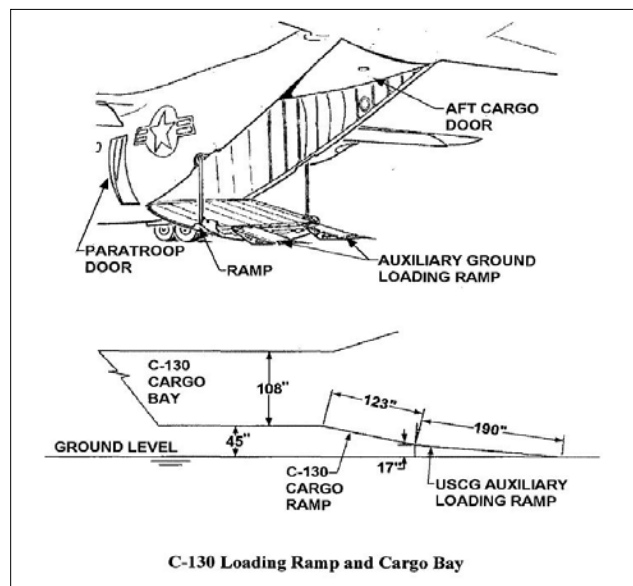
Arctic Craft Demonstration Report

6.3 Arctic Craft Capabilities

The CG has identified and listed below some capabilities that a CG Arctic Craft would ultimately need to address to perform the nine statutory CG missions anticipated in the Arctic. However, for this demonstration, it is not required that a craft demonstrate all of the capabilities identified below. Failure to meet two or more of the capabilities is not disqualifying. Note, the capabilities are not listed in an order of priority.

The craft shall be capable of:

1. being transported in a C-130 aircraft (Maximum height – 9 feet 1 inch, Maximum width -8 feet 6 inches, and maximum length – 35 feet 10 inches, maximum weight of 40,000 lbs). Dimensions are maximum dimensions for the craft and any associated gear or trailers needed to move the craft. Craft should either be on a trailer or able to be loaded and transported without a trailer;



2. operating in extremely shallow water (Objective: 18 inch draft, Threshold: 36 inch draft);
3. seating a coxswain plus three-person crew wearing USCG Boat Crew Dry Suits with gloved hands. There should also be room for passengers (no definitive number at this time) and rescue equipment protected from the environment. Preference will be given to craft incorporating Human Systems Integration concepts. (For more information on CG Boat Crew Outfitting see the Rescue and Survival Systems Manual at http://www.uscg.mil/directives/cim/10000-10999/cim_10470_10f.pdf);
4. impacting with loose ice and floating debris with no damage to the hull (Threshold: 5 knots);
5. operating in slush ice (Objective: Top Speed, Threshold: 5 knots);
6. towing like weighted craft;
7. being hoisted by either a ship or land based crane;
8. protecting the crew from the environment and providing adequate heating for the crew (Preferably a hard shell cabin);
9. operating in excessively high sea states (Objective: 8ft Significant Wave Height, Threshold: 3ft Significant Wave Height);
10. operating in high winds (Objective: 75knots, Threshold: 25 knots);



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11. long range operations (Objective: 250 Nautical Miles, Threshold: 150 Nautical Miles);
12. being stored in a non-climate controlled space;
13. being launched and retrieved at remote, unimproved beach location, and/or
14. quickly getting underway from a cold storage condition. (Threshold: 20 minutes, Objective: Immediate start-up)

6.4 Arctic Craft Demonstration

At the most basic level, every CG asset is a platform that transfers mission essential equipment and personnel from their base of operations to where they are needed to accomplish a mission requirement. Fundamentally, this demonstration is for the purpose of determining which Arctic Craft type and associated propulsion system has the best mobility in the challenging Arctic environment to perform this transportation requirement. Where possible, this demonstration will also provide insights on how each craft's capabilities support specific mission and logistical requirements.

The Offeror shall make available an Arctic Craft for an operational demonstration on the North Slope of Alaska in Barrow, Alaska for the five-day period of 13 to 17 August 2012. While slight, the possibility that the demonstration dates may be shifted is a possibility. Each Offeror shall submit their proposal demonstrating their adaptability to accommodate, with a 30-day notice, a shift in the demonstration dates to any five-day window within the month of August 2012. The demonstration shall last five days and will follow the negotiated Agenda/Test Plan for Arctic Craft Demonstration (See Section IV. Proposals, Volume I: Technical Proposal, Part 2 for additional information). The Offeror shall be responsible for the delivery of the Arctic Craft to Barrow, Alaska for the demonstration and its return to the Offeror's possession. The Offeror shall be responsible for the deployment, safe operation, retrieval, and storage of the Arctic Craft during the demonstration. The Offeror, during the demonstration, shall operate the craft while being observed by the Coast Guard. When practical and safe, Coast Guard personnel will observe the tests as passengers in the craft. The Offeror shall provide and utilize all applicable safety and protective equipment needed for their personnel. The CG will be responsible for all personal protective equipment for CG personnel. The craft must comply with all state and federal regulations applicable to the craft.

7. Point of Contact

All questions must be in writing addressed to the Contract Specialist, Joyce.M.Overton@uscg.mil. Only Contracting Officers are legally authorized to commit the Government.

8. Additional Information

This announcement is restricted to developing a Proposal, followed by an Award for the demonstration of an Arctic Craft on the North Slope of Alaska.

Awards made under this BAA are for the demonstration of an Arctic Craft on the North Slope of Alaska.

Any hardware or software developed under a contract resulting from this BAA will be retained by the Offeror. The Coast Guard will not retain ownership of the arctic craft that will be demonstrated (i.e., proofs of concept or prototypes).

The Offeror is expected to provide all resources including labor, equipment and real property necessary for the performance of this required demonstration. No equipment, facilities, fuel, or assistance of any kind will be provided by the Coast Guard for the demonstration.



7.3.1.1.2 II. AWARD INFORMATION

7.3.1.1.3

Award(s) will be made to the Offeror(s) whose proposals are considered to have the highest technical importance to the Government in accordance with the evaluation criteria, taking into consideration the available funding. It is anticipated that cost-plus-fixed-fee (CPFF) completion form or firm-fixed-price (FFP) contracts will be awarded. The Offeror shall state in the proposal whether they are proposing a CPFF completion form or a FFP contract.

The Government anticipates making award on initial offers and does not expect to hold discussions. Consequently, Offerors are advised that failure to provide the required information and supporting documentation with their proposal will result in rejection of the offer if it is in the Government's best interest to do so rather than opening discussions.

The period of performance for these awards is expected to be 270 days from date of award. The demonstration will be five days and is expected to be on or about 13-17 August 2012. The RDC anticipates a total budget of \$600,000 for the demonstrations. The RDC intends to fully fund up to three contracts. The anticipated date of award is approximately 15 May 2012, subject to the availability of funds.

III. ELIGIBILITY INFORMATION

All responsible sources may submit a proposal, which will be considered by the Government. Historically Black Colleges and Universities (HBCUs) and Minority Institutions (MIs) are encouraged to submit proposals and join others in submitting proposals. However, no portion of this BAA will be set aside for HBCU and MI participation due to the impracticality of reserving discrete or severable areas of technology of this proposal for exclusive competition among those entities.

IV. PROPOSALS

Proposals must be submitted via email (in MS Word or Excel format) prior to 2:00 p.m. local time on 16 March 2012. The Technical Proposal shall be separate from the Cost Proposal. The Cost Proposal and Technical Proposal shall be submitted electronically to Joyce.M.Overton@uscg.mil.

The original and 5 hard copies of the Technical Proposal, and the original and one hard copy of the Cost Proposal must also be submitted by 2:00 p.m. local time on 16 March 2012.

The Prime Contractor is responsible for ensuring that all subcontractor proposals are submitted electronically and by hard copy by the established due dates. The proposal shall be marked "Source Selection Sensitive". Hard copies shall be addressed to the following address:

United States Coast Guard

Research and Development Center

Attn: Joyce M. Overton, Contract Specialist

1 Chelsea Street

New London, CT 06320



Arctic Craft Demonstration Report

Proposal submissions will be protected from unauthorized disclosure in accordance with FAR 15.207. Offerors shall appropriately mark each page of their submission that contains proprietary information. As discussed in this BAA, Volume I: Technical Proposal, Part 2, the proposal shall include a severable, self-standing Statement of Work (SOW), Deliverables List, and Agenda/Test Plan for Arctic Craft Demonstration that contains only unclassified information and does not include classified and proprietary restrictions.

Proposal Format – Volume 1 (Technical Proposal) and Volume 2 (Cost Proposal)

- Paper Size – 8.5 x 11 inch paper
- Margins – 1 inch
- Spacing – single or double-spaced
- Font – Times New Roman, 12 point
- Other allowable: Charts/graphs may exceed the 8.5 x 11 inch paper size.
- Number of Pages – Part 1 of Volume 1 is limited to no more than ten pages not including attachments (résumés). Part 2 of Volume 1, Statement of Work (including Assertion of Data Rights), Deliverable List, Agenda/Test Plan for Arctic Craft Demonstration has no page limit. Volume 2 has no page limit. Proposals exceeding the page restriction may be excluded from review.

Volume I: Technical Proposal

The Technical Proposal shall consist of a cover page and two parts. Part 1 shall provide an executive summary of the technical proposal, a description of Technical Approach, Staffing, Corporate Experience, and Past Performance. Part 2 shall provide the proposed Statement of Work with its task/subtask breakdown, Deliverable List, Agenda/Test Plan for Arctic Craft Demonstration, and address any data rights issues.

Cover Page shall include the words “Volume I: Technical Proposal” and the following:

- a. BAA Number;
- b. Title of Proposal;
- c. Identity of prime Offeror and complete list of subcontractors, if applicable;
- d. Principal Investigator (PI) contact (name, address, phone/fax, electronic mail address);
- e. Contracting/Business contact (name, address, phone/fax, electronic mail address);
- f. Period of Performance (duration of effort); and
- g. Any proprietary data disclosure statement, if applicable.

Part 1 shall include the following sections and be limited to ten pages:

1. Technical Approach

As each item is addressed below, clearly state any assumptions:

- a. The Offeror shall clearly and completely describe the Arctic Craft that will be demonstrated. The technical approach shall also identify the technology readiness (prototype or production model) of the proposed arctic craft and its key components. The technical approach shall be described in as much detail as necessary to establish confidence in the demonstration of the capabilities. For each of the capabilities identified in section 6.3, the Offeror shall describe their craft's performance against each capability's standard and to what level they meet or do not meet the standard.



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- b. The Offeror shall also provide information on the possible environmental impact on the Arctic environment during the demonstration. At a minimum, address high noise levels, craft footprint, and engine emissions.
 - c. The Offeror shall describe in as much detail as possible the logistical plan that supports the execution of their Agenda/Test Plan for Arctic Craft Demonstration in Barrow, Alaska during the month of August 2012.
 - d. The Offeror shall provide verification that the craft will comply with all state and federal regulations applicable to the craft.
 - e. The Offeror shall describe how they would accommodate, with a 30-day notice, a shift in the demonstration dates to any five-day window within the month of August 2012.
2. Staffing - The proposal shall provide brief summaries clearly demonstrating the relevant skills, experience, and qualifications necessary to accomplish the demonstration.

Based on the Offeror's proposed Statement of Work, the Offeror shall provide a breakdown detailing the proposed level of effort (in hours by individual) and the team composition (prime and subcontractors) being proposed. Provide the details relative to the roles, responsibilities, and level of involvement of each proposed individual. Include rationale as to the appropriateness of the skill mix and team composition to satisfy task requirements.

Submit resumes for proposed lead personnel that the Offeror determines to be critical to the success of the project, clearly demonstrate the education, training, and experience of the proposed individuals relevant to the Offeror's SOW tasking. The resumes will not count against the ten-page count.

3. Corporate Experience

The proposal shall submit a brief project summary of the most relevant prior efforts (within the last three years) completed within the past three years including funding amounts and clear descriptions of the work, roles and responsibilities relevant to this effort. Each project summary shall:

- a) identify the customer (agency or client), the resources and cost expended, and the period of performance;
 - b) provide a brief description of the scope of the effort and a brief discussion of its relevance to this contract; and
4. Past Performance - Provide the following for each project summary submitted:
 - a) Name of Government Contracting Officers Representative (COR) and Contracting Officer (or if citing non-Government example, name of customer POC);
 - b) Name, address, phone number, and, e-mail address of the POC; and
 - c) Contract Number (and if applicable Task/Delivery Order Number)

If you have no relevant past performance history, you must affirmatively so state. Offerors with no relevant past performance history, will not be evaluated favorably or unfavorably under this section, in accordance with FAR 15.305. In the case of a relatively new firm (i.e., established within the last 18 months), the Offeror may submit past performance information for contracts on which its corporate management has performed, to supplement any past performance information for the firm itself. This shall be specifically noted in the proposal submission.



Arctic Craft Demonstration Report

Part 2 shall include a Statement of Work (SOW), Corresponding Deliverables List and an Agenda/Test Plan for Arctic Craft Demonstration (no page limit):

Statement of Work (SOW) and Corresponding Deliverables List: A sample SOW is provided to show the formatting required. Offerors must provide a SOW that matches their technical proposal and the SOW must be detailed enough to support the contract type. The SOW shall clearly detail the scope and objective of the demonstration efforts, including the technical approach and the schedule of technical tasks, subtasks, events, and milestones.

The Statement of Work must include the following for the demonstration:

1. Kickoff Meeting: In a teleconference meeting with RDC personnel, the Offeror is to provide details on how each of the demonstration capabilities will be addressed by the technologies being proposed.
2. Progress Meetings: Teleconference meetings shall be held as needed with RDC personnel to discuss progress and issues to date. Prior to the demonstration, one of the progress meetings may be held at the Offeror's site.
3. Special Requirements: The SOW shall identify any specialized requirements needed to successfully accomplish arctic craft demonstrations (e.g., the need for storage, supplies, etc.). Provide detailed information on how the contractor plans to ship the craft and associated gear to the test location.
4. Monthly Progress/Expenditure Report and Archive: The Offeror shall provide a Monthly Progress/Expenditure Report and, at the end of the period of performance, provide a CD-ROM Archive containing all submitted deliverables.

Assertion of Data Rights: The Offeror shall include a summary of any proprietary rights to pre-existing data related to techniques, prototypes, or systems supporting and/or necessary for the use of the research, results, and/or prototype. Any rights assertions made in other parts of the proposal that would impact the rights in this section shall be cross-referenced. If there are proprietary rights, the Offeror shall explain how these affect the demonstration. Offerors asserting Data Rights shall do so in accordance with the clause in FAR 52.227.15, "Representation of Limited Rights Data and Restricted Computer Software." The Government anticipates incorporating FAR Clauses 52.227-14 along with applicable alternates II, III, IV and V. If there are no claims of proprietary rights in pre-existing data, this section shall consist of a statement to that effect.

It is the intent of the Government to use the Offeror's SOW, as written, provided that the Offeror's SOW accurately describes the demonstration of the capabilities in section 6.3. If in the Government's opinion, the Offeror's SOW does not reflect the requirements, the Government will prepare a SOW using information available in the Offeror's proposal or have the Offeror rewrite the SOW to reflect their technical approach.

The SOW shall be a severable self-standing document without any proprietary restrictions. The Offeror shall format the SOW and Deliverables List using the sample provided in Attachments A and B as a guide. Deliverables shall be cross-referenced in the SOW.

Agenda/Test Plan for Arctic Craft Demonstration: Considering the capabilities desired in section 6.3, the capabilities of their Craft and the environmental and logistical conditions at the test area, the Offeror shall generate an Agenda/Test Plan for Arctic Craft Demonstration, which provides sufficient detail to describe the specifics of demonstrating their craft's capabilities. The Offeror shall make safety paramount and ensure their Agenda/Test Plan minimizes risk to the craft, operators and passengers. To this end, the Offeror shall list any safety precautions, procedures or constraints in the plan. A SAMPLE Agenda/Test Plan for Arctic Craft Demonstration is



provided in Attachment C as a framework. This SAMPLE Agenda/Test Plan provides insights into testing schedules and types of demonstrations, but has insufficient detail to execute the demonstrations.

The Offeror's Agenda/Test Plan shall be a severable self-standing document without any proprietary restrictions. It is the intent of the Government to use the Offeror's Agenda/Test Plan, as written, provided that the Offeror's Agenda/Test Plan accurately describes a safe and low risk demonstration of their craft against the capabilities in section 6.3. If in the Government's opinion, the Offeror's Agenda/Test Plan does not meet this standard, the Government will prepare an Agenda/Test Plan using information available in the Offeror's proposal. The final version will be negotiated and bilaterally agreed to by the Government and the selected Offerors, and will become a requirement of the contract.

Volume II: Cost Proposal

The Cost Proposal shall include a cover page and shall provide a detailed cost breakdown of all proposed costs by cost category.

For proposal pricing purposes, Offerors shall assume a contract start date on or about 15 May 2012. The cost proposal shall be limited to the minimum number of pages necessary to satisfy the specific requirements set forth below. Submission of computer-generated data is not desired but if it is essential to support the cost proposal, it may be submitted as an addendum and must be clearly cross-referenced to the material it supports in the cost proposal.

Cost proposals shall represent the Offeror's best response to the solicitation. The cost proposal **must** be sufficient to establish the reasonableness, realism and completeness of the proposed cost/price. Further, any modifications made to the initial proposal must likewise be thoroughly supported in writing regardless of whether such changes are made during negotiations or at the time of a proposal revision.

The Government contemplates the award of cost-plus-fixed-fee (CPFF) completion form or firm-fixed-price (FFP) contracts resulting from this BAA. The Offeror shall state in the proposal whether they are proposing a CPFF completion form or a FFP contract.

- **Cover Page** shall include the words "Cost Proposal" and the following:
 - 1) BAA Number;
 - 2) Title of Proposal;
 - 3) Identity of prime Offeror and complete list of subcontractors if applicable;
 - 4) Technical contact (name, address, phone/fax, electronic mail address);
 - 5) Contracting/Business contact (name, address, phone/fax, electronic mail address);
 - 6) Period of Performance (duration of effort);
 - 7) Proposed Contract Type (e.g., cost-plus-fixed-fee (CPFF) completion form or firm-fixed-price (FFP))
 - 8) Summary statement of proposed costs and fee; and
 - 9) Cognizant DCAA and DCMA point of contact, address, phone/fax, and electronic mail address (if available).
- **Cost Proposal** shall provide a detailed breakdown of all costs by cost category (by Offeror's fiscal year) and proposed fee:
 - 1) **Direct Labor** – Provide individual or labor category with associated labor hours and unburdened direct labor rates;



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- 2) Other Direct Costs –
Materials - shall be specifically itemized with description of proposed items and associated number of units, unit costs and total amount. Back-up information such as vendor quotes or catalog prices to support these costs **must** be provided; Travel – Travel must be proposed in accordance with Federal Travel Regulations. Estimated cost of travel along with number of trips, number of people, number of days per trip, departure and arrival destinations, etc. ; travel shall be broken out to include air fare, per diem, car rental rates, etc.; and Shipping – Estimated costs for shipping the craft and associated equipment to test location.
- 3) Subcontracts/Consultants - For subcontracted work, identify the item/services to be subcontracted and the basis for which the subcontractor was selected. Identify the type of contractual arrangement contemplated, and provide a price analysis of the proposed subcontract in accordance with FAR 15-404-1(b) concerning reasonableness, realism and completeness of each subcontractor's proposal. A separate cost proposal for each subcontractor will be required with the same level of detail as the prime Offeror's cost proposal. (The subcontractor's cost proposal can be provided in a sealed envelope with the Offeror's cost proposal or submitted by the subcontractor directly to the Government by the due date for receipt of proposals.); For Consultants - Provide consultant agreement or other document which verifies the proposed loaded daily/hourly rate.
- 4) Indirect Costs – i.e., Fringe Benefits, Overhead, G&A, Cost of Money, etc. (Must show the base amount and rate which will be applied to that base) State whether these rates are DCAA approved rates;
- 5) Proposed Fee/Profit, including fee percentage.

V. SIGNIFICANT DATES AND TIMES

Anticipated Schedule of Events	
Proposal Due Date	16 March 2012
Contract Award(s)*	15 May 2012
Kickoff Meeting	Within 14 Days after Contract Award(s)
Demonstrations	13-17 August 2012

* These dates and times are estimates as of the date of this announcement.

VI. EVALUATION INFORMATION

Evaluation Criteria

There are two evaluation criteria: Technical and Cost . Technical is significantly more important than Cost

Technical Approach, Staffing, Corporate Experience and Past Performance are weighted in descending order of importance.

Technical

1. Technical Approach – Comprised of the following sub-criteria in descending order of importance:



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- a. Degree to which the proposed craft meets each of the capabilities identified in section 6.3.
 - b. Degree to which the proposed craft minimizes the negative impact to the environment.
 - c. Completeness and executability of the logistical plans for conducting the demonstration of the proposed arctic craft.
 - d. Technology readiness level of the proposed craft.
 - e. The proposed craft must comply with all state and federal regulations applicable to the proposed craft.
 - f. Degree to which the Offeror can accommodate, with a 30-day notice, a shift in the demonstration dates to any five-day window within the month of August 2012.
2. Staffing – The relevant skills, experience, and qualifications necessary to accomplish the demonstration.
 3. Corporate Experience – The relevance of the Offeror's submitted experience to the scope of the BAA.
 4. Past Performance – Customer ratings on the experience cited in Corporate Experience.

Cost

Cost proposals shall be reviewed for completeness and compliance with the solicitation requirements and for cost realism and reasonableness.

Completeness and Compliance - The cost proposal will first be reviewed to determine if it complies with the cost proposal preparation instructions and any other applicable directions.

Cost Realism - The cost proposal will be reviewed to determine if the proposed costs are realistic for the work to be performed, reflect a clear understanding of the Government's requirements, and are consistent with the various elements of the Offeror's technical proposal.

Evaluation Panel

Technical and cost proposals submitted under this BAA will be protected from unauthorized disclosure in accordance with FAR 3.104-4 and 15.207. The program officer and other Government scientific experts will perform the evaluation of technical proposals. Cost proposals will be evaluated by the Contract Specialist/Contracting Officer.

VII. AWARD ADMINISTRATION INFORMATION

1. Administrative Requirements

- The North American Industry Classification System (NAICS) code – The NAICS code for this announcement is 541712 with a small business size standard of 500 employees.
- Central Contractor Registry (CCR) - Successful Offerors will be required to register in the CCR prior to award of any contract. Information on CCR registration is available at <http://www.ccr.gov> or by calling 1-888-227-2423.

Online Representations and Certifications Application (ORCA) – Successful Offerors will be required to register in the ORCA prior to award of any contract. Information on ORCA registration is available at <http://orca.bpn.gov>.



APPENDIX B. SAFETY AND COMMUNICATIONS PLAN

Arctic Craft Demonstration
Safety & Communications Plan

Location: Barrow, Alaska

Dates: 08/13 – 08/18/2012

Project conducted by:

U.S. Coast Guard Research & Development Center
New London, CT



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- *Safety is paramount!*
- The Project Safety Officer for the Coast Guard will be announced on or before the first demonstration day. The Safety Officer shall be responsible for ensuring all participants comply with the safety plan. And observe good safety protocols at all times when operating under the auspices of the Coast Guard demonstration.

Safety Officer will:

- Ensure the SAFETY PLAN is developed and accomplished.
- Coordinate with Project Manager and Contractors to make final GO/NO Go decisions for demonstration activities.
- Monitor safety progress
- Conduct and coordinate the demonstration debrief.

Demonstration Participants will:

- Be familiar with the Safety Plan and safety procedures.
- Ensure all safety procedures and rules are followed.
- Contact the safety officer to report all safety discrepancies or safety issues.
- Observe good safety protocols at all times when operating under the auspices of the Coast Guard demonstration.
- ***All participants are ultimately responsible for their own safety.*** All participants shall maintain due diligence and strictly observe training limits as set by this plan or contractor policies. All project and agency prescribed safety protocols are mandatory and violators will be removed from project activities until the situation is corrected to the satisfaction of the safety officer.
- ANYONE is authorized to suspend any activity should an unsafe situation develop. Any individual that notices a potentially hazardous situation shall notify the Safety Officer on CH 21A with a short explanation of the situation.
- Safety will be handled in accordance with established policies and procedures. No established personal or vessel safety standards or procedures will be altered or suspended for this demonstration.
- In the event of unfavorable weather or other conditions that present a potentially unsafe condition for demonstration play, the Safety Officer will consult with CG and contractor personnel to determine if the demonstration shall be cancelled or delayed.

On water activities will take place in the specified area. For the demonstration, all activity will be in a “box” as shown below. Vessels are not authorized outside of this boundary unless specifically authorized by the demonstration project manager or safety officer.



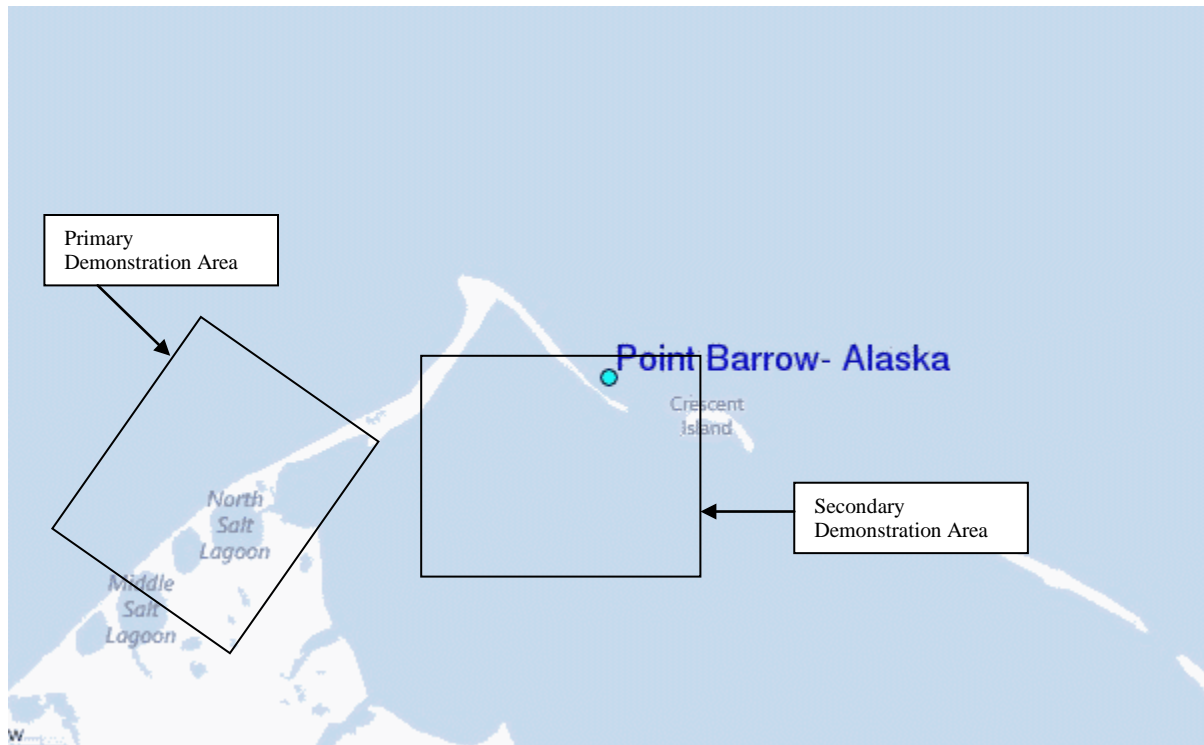


Figure A-1. Diagram of Demonstration Areas –Vessels shall not operate outside the operations area without advance planning and explicit approval.

Demonstration SAFETY STOP Rules

- The Project Manager, Safety Officer and each vessel operator is authorized to suspend operations should any unsafe situation develop.
 - *SAFETY STOP* procedures will be instituted by use of the word "*SAFETY STOP*."
 - Every participant has the authority and duty to stop a demonstration event for safety reasons.
 - *SAFETY STOP* procedures will be used in the event of real life injury, emergency, unsafe situation or real life SAR requirements.
1. Once the word *SAFETY STOP* is used, all action at that particular scene will cease. The Project Manager and Safety Officer must be notified immediately when there has been a *SAFETY STOP* incident. Any actual distress will take precedence over this demonstration. Injured personnel will be triaged and transported to area hospitals as required
 2. Once *SAFETY STOP* has been instituted, only the Project Manager may restart the demonstration.
 3. Any actual injury/ emergency will be immediately reported to the Safety Officer.

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- If the demonstration must be stopped for any safety reason, the following will be announced on all circuits:

"SAFETY STOP, SAFETY STOP, SAFETY STOP..... SUSPEND DEMONSTRATION ACTIVITIES. STANDBY FOR FURTHER DIRECTIONS" All demonstration activities will cease until further notice.

Specific Safety Procedures

- All demonstration participants shall attend a daily safety brief prior to the start of each day's activities. The Safety Officer shall conduct and coordinate the briefing. The brief shall include completion of the USCG GAR (Green-Amber-Red) Operational Safety model.
- All existing safety precautions shall be employed as in an actual situation.
- Every individual is responsible for his or her safety
- Proper personal protective equipment must be worn for the expected conditions. All personnel onboard vessels will wear Personal Floatation Device (**PFD**) or equivalent at all applicable times.
- The consumption of alcohol or use of illegal drugs is prohibited. Participants with suspect or impaired behavior will be removed from the demonstration.
- Supervisors are responsible for the safety of those working for them.
- If you ever question the safety of an action, or do not know how to do it safely, consult your supervisor.
- All vessels will obey navigation rules and utilize appropriate running lights.
- Boat coxswains will be responsible for determining safe conditions for their boat operations.
- The safety officer shall ensure all participants are protected from potential hypothermia exposure, and receive adequate periods of rest and nourishment.
- Slips, trips and falls for demonstration participants: All slip, trips and fall hazards will be corrected if possible, and adequately marked if not and immediately reported to the safety officer.
- **Weather Limitations:** Operations shall not be conducted when the following weather conditions are encountered.
 - Small Craft Advisory in effect for the local area. Sustained winds or frequent gusts of 23 to 33 knots. A small craft advisory for rough seas may be issued for sea/wave conditions deemed locally significant, based on user needs, and should be no lower than 8 feet.



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- Visibility less than 1 NM due to rain or fog.
- Sea Ice conditions beyond the stated design ability of the vessels to maneuver within, on, or around given other prevailing conditions.

Accident Reporting: All injuries, incidents and accidents regardless of severity shall be immediately reported to the nearest controller. Anyone observing a participant who is seriously ill or injured will notify emergency medical services and the demonstration safety officer and render assistance as training allows.

Hypothermia: All participants are to be familiar with and alert to the key signs of Hypothermia. Figure 1 depicts some of the most common Hypothermia symptoms.

Hypothermia is comprised of three stages – mild, moderate and severe as depicted in the following table:

7.3.1.2 SIGN	7.3.1.3 MILD	7.3.1.4 MODERATE	7.3.1.5 SEVERE
Pulse	Normal.	Slow and weak.	Weak, irregular or absent.
Breathing	Normal.	Slow and shallow.	Slow or absent.
Appearance	Shivering, slurred speech.	Shivering violently or stopped, clumsy, stumbling, pupils dilated, skin bluish.	Shivering has stopped.
Mental State	Conscious but withdrawn or disinterested.	Confused, sleepy, irrational.	Unconscious.

Medical Facilities:

- Samuel Simmonds Memorial Hospital: 907-852-4611
- Barrow Fire Department: 911 or non-emergency 907-852-0234
- Police Dispatch: 911, VHF Ch 16, or non-emergency 907-852-0311.
- NSB Search and Rescue Office: 907-852-2822 or 1-800-830-2822

Communications Frequencies

- Each R&D Center staff member shall be issued a hand held VHF-FM radio for communication with other craft and personnel on shore. The following frequencies will be used during the demonstration.
- VHF-FM 21A (157.0500 Mhz): The primary working channel for all demonstration units.
- VHF-FM 23A (157.1500 Mhz): The secondary working channel for all demonstration units.
- VHF-FM 16: Channel 16 is the international emergency distress and hailing channel. If unable to reach demonstration participants on the assigned working channels, try hailing them on Channel 16. Once contact is established, shift to a working channel.



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- VHF-FM 68: North Slope Borough SAR office.
- A cell phone list of demonstration participants will be consolidated and provided on day one of the demonstration.

Demonstration Suspend/Stop/End Communications

- If the demonstration must be stopped for any reason other than ENDEX, the following will be announced on all primary working channels: **"SAFETY STOP, SAFETY STOP, SAFETY STOP..... THIS IS DEMONSTRATION CONTROL..... SUSPEND DEMONSTRATION ACTIVITIES. STANDBY FOR FURTHER DIRECTIONS"** All demonstration actions will cease until further notice.
- When the demonstration is stopped for ENDEX, the following will be announced on all circuits: **"SECURITE, SECURITE, SECURITE, THIS IS DEMONSTRATION CONTROL - FINISH DEMONSTRATION. VESSELS RETURN TO LAUNCH."** All demonstration actions will cease.

Special Considerations

- A safety brief for all participants will be conducted each morning before activities commence. The safety brief will include completion of the standard USCG GAR (Green Amber Red) Model included at the end of this plan.
- Go/No Go: Each morning the day's current and forecast weather shall be addressed at the morning briefing. The participants will decide then whether any alterations are required to the day's routine including cancelling, delaying, or rescheduling the planned activities.
- When demonstration craft are underway, they shall report their status every 30 minutes to the designated on shore representative that day. In general, this will be either the project manager or safety officer.
- Ch 16 VHF will be used to transmit real world safety or assistance communications. As previously addressed, this channel should only be used if unable to reach another demonstration participant on the primary channels or if a real emergency occurs.

